IN THE CLAIMS

1. (Currently Amended) A method for in-situ and real-time plasma chamber condition monitoring, comprising:

inserting a non-production wafer into a plasma chamber;

injecting a probing gas into ~~a plasma chamber~~ the plasma chamber, the probing gas comprising a source of free radicals;

striking the probing gas into a probing plasma;

measuring a density ~~the emission intensities~~ of the free radicals in the probing plasma; and

determining whether to ~~continue a plasma process~~ commence plasma processing of a production wafer on the basis of the measured density of the free radicals ~~emission intensities~~.

2. (Currently Amended) The method of claim 1 wherein the probing gas ~~plasma~~ includes ~~at least a free radical such as Br, Cl, O or F, preferably BR, and~~ an inert gas ~~molecule~~.

3. (Currently Amended) The method of claim 2 wherein the inert gas ~~molecule~~ accounts for 5%-10% of the probing gas ~~plasma~~.

4. (Currently Amended) The method of claim 2 wherein the density of [[a]] the free radicals ~~radical in the probing plasma~~ is defined as ~~the~~ a ratio of emission intensities ~~between~~ of the free radicals ~~radical~~ and the inert gas ~~molecule~~ .

5. (Currently Amended) The method of claim 4 wherein the density of the free radicals ~~radical density~~ is compared with a first predefined level.

6. (Currently Amended) The method of claim 5 further comprising:

taking the plasma chamber out of production ~~wherein if~~ in response to a determination that the density of the free radicals ~~radical density~~ is below the first predefined level~~, the plasma chamber is taken off production~~.

7. (Currently Amended) The method of claim 4 wherein the density of the free radicals ~~radical density~~ is compared with a second predefined level.

8. (Currently Amended) The method of claim 7 further comprising:

processing the production wafer in response to a determination that ~~wherein if~~ the density of the free radicals ~~radical density~~ is above the second predefined level~~, the plasma chamber is brought back to production~~.

9. (Original) The method of claim 1 wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

10. (Original) The method of claim 1 wherein the probing plasma also includes at least one of Ar or Xe.

11. (Currently Amended) A method for controlling a seasoning process ~~detecting over-seasoning~~ in a plasma chamber comprising:

injecting a seasoning gas into a plasma chamber, the seasoning gas comprising a source of free radicals;

striking the seasoning gas into a seasoning plasma;

seasoning the processing chamber;

measuring a density ~~the emission intensities~~ of the free radicals in the seasoning plasma; and

determining [[if]] when the plasma chamber is seasoned ~~over-seasoned or not~~ according to the measured density of the free radicals ~~emission intensities~~.

12. (Currently Amended) The method of claim 11 wherein the seasoning ~~plasma~~ gas includes an inert gas and at least one of ~~a free radical such as~~ Br, Cl, O or F~~, preferably BR, and an inert gas molecule~~.

13. (Currently Amended) The method of claim 12 wherein the inert gas ~~molecule~~ accounts for 5%-10% of the seasoning gas ~~plasma~~.

14. (Currently Amended) The method of claim 12 wherein the density of [[a]] the free radicals ~~radical in the seasoning plasma~~ is defined as ~~the~~ a ratio of emission intensities ~~between~~ of the free radicals ~~radical~~ and the inert gas ~~molecule~~.

15. (Currently Amended) The method of claim 14 wherein the density of the free radicals ~~radical density~~ is compared with a predefined level.

16. (Currently Amended) The method of claim 15 further comprising:

extinguishing the seasoning plasma ~~wherein if~~ when the density of the free radicals ~~radical density~~ is above the predefined level~~, the chamber seasoning is deemed to be complete~~.

17. (Original) The method of claim 11 wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

18. (Currently Amended) The method of ~~claim 17~~ claim 12 wherein the inert gas comprises ~~probing plasma also includes~~ at least one of Ar or Xe.

19. (Currently Amended) A method for detecting process drift in a plasma chamber comprising:

injecting a process gas into a plasma chamber, the process gas comprising a source of free radicals;

striking the process gas into a process plasma;

measuring a density ~~the emission intensities~~ of the free radicals in the process plasma; and

determining ~~the~~ an extent of process drift according to the measured density of the free radicals ~~emission intensities~~.

20. (Currently Amended) The method of claim 19 wherein the process plasma includes ~~at least a free radical and~~ an inert gas ~~molecule~~.

21. (Currently Amended) The method of claim 20 wherein the inert gas ~~molecule~~ accounts for 5%-10% of the process gas ~~seasoning plasma~~.

22. (Currently Amended) The method of claim 20 wherein the density of [[a]] the free radicals ~~radical in the process plasma~~ is defined as the ratio of emission intensities ~~between~~ of the free radicals ~~radical~~ and the inert gas ~~molecule~~.

23. (Currently Amended) The method of ~~claim 2~~ claim 19 wherein the density of the free radicals ~~radical density~~ is compared with a predefined level.

24. (Currently Amended) The method of claim 23 further comprising:

deeming the plasma chamber unsuitable for production ~~wherein if~~ when the density of the free radicals ~~radical density~~ is below the predefined level, ~~the plasma chamber is deemed to be unsuitable for production wafer etching~~.

25. (Original) The method of claim 19, wherein the free radicals in the probing plasma include at least one of Br, Cl, O or F.

26. (Original) The method of claim 25 wherein the probing plasma also includes at least one of Ar or Xe.

27-30. (Cancelled)

31. (New) The method of claim 1, wherein the source further comprises at least one of Br_2, Cl_2, O_2, and CF_4.

32. (New) The method of claim 11, wherein the source further comprises at least one of Br_2, Cl_2, O_2, and CF_4.

33. (New) The method of claim 19, wherein the source further comprises at least one of Br_2, Cl_2, O_2, and CF_4.